

BACULITES ALAVENSIS SANTAMARIA ZABALA, 1996
(CEPHALOPODA, AMMONOIDEA),
FROM THE UPPER CAMPANIAN OF NORTHERN SPAIN

By

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(With 5 figures)

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ABSTRACT

Several specimens of the poorly known *Baculites alavensis* Santamaria Zabala, 1996, are described from the Upper Campanian of Ecay, northern Spain. These fully display the typical ornament of the species. Affinities with *B. leopoliensis* Nowak, 1908, *B. alonsoi* Santamaria Zabala, 1996, *Trachybaculites columna* Morton, 1834, *B. vanhoepeni* Venzo, 1936, and *B. sulcatus* Baily, 1855, are discussed.

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INTRODUCTION

Baculites alavensis is here described on the basis of numerous specimens collected by one of us (T.K.) in Spain to illustrate the intraspecific variation of the species, as well as to compare it with baculitid species of similar morphologies.

LOCATION OF SPECIMENS

All the Spanish specimens are housed in the private collection of T. K uchler, Berlin, Germany; other figured specimens are housed in the collections of the South African Museum, Cape Town.

SYSTEMATIC PALAEOLOGY

Class CEPHALOPODA Cuvier, 1797

Order AMMONOIDEA Zittel, 1884

Suborder ANCYLOCERATINA Wiedmann, 1966

Family Baculitidae Gill, 1871

Genus *Baculites* Lamarck, 1799

Baculites alavensis Santamaria Zabala, 1996

Figs 1, 2A-F, 3, 4, 5I-L

? 1986a *Baculites* sp. 5. Kennedy, p. 113, pl. 18 (figs 2-3).

? 1986b *Baculites leopoliensis* Nowak; Kennedy, p. 1013, pl. 2 (figs 1-2, 11-12), pl. 3 (figs 22-24).

1996 *Baculites alavensis* Santamaria Zabala, p. 14, pl. 3 (figs 7-9).

Type

Holotype by original designation is the specimen figured by Santamaria Zabala (1996, pl. 3 (fig. 8)) from the Upper Campanian of Ullibarri-Jauregui in the province of Alava, northern Spain.

Material

EC1-100+26 m/1-3, 7-8; EC1-102/3-4; EC1-104/a-b; EC1-106/a-e; EC1-106/1-7; EC1-107/a-b, EC1-108/a-d, all from the Upper Campanian of Ecay, Navarra, northern Spain.

Description

All the specimens appear to be composite moulds, preserved in grey siltstone; all are crushed to varying degrees and none shows the suture lines.

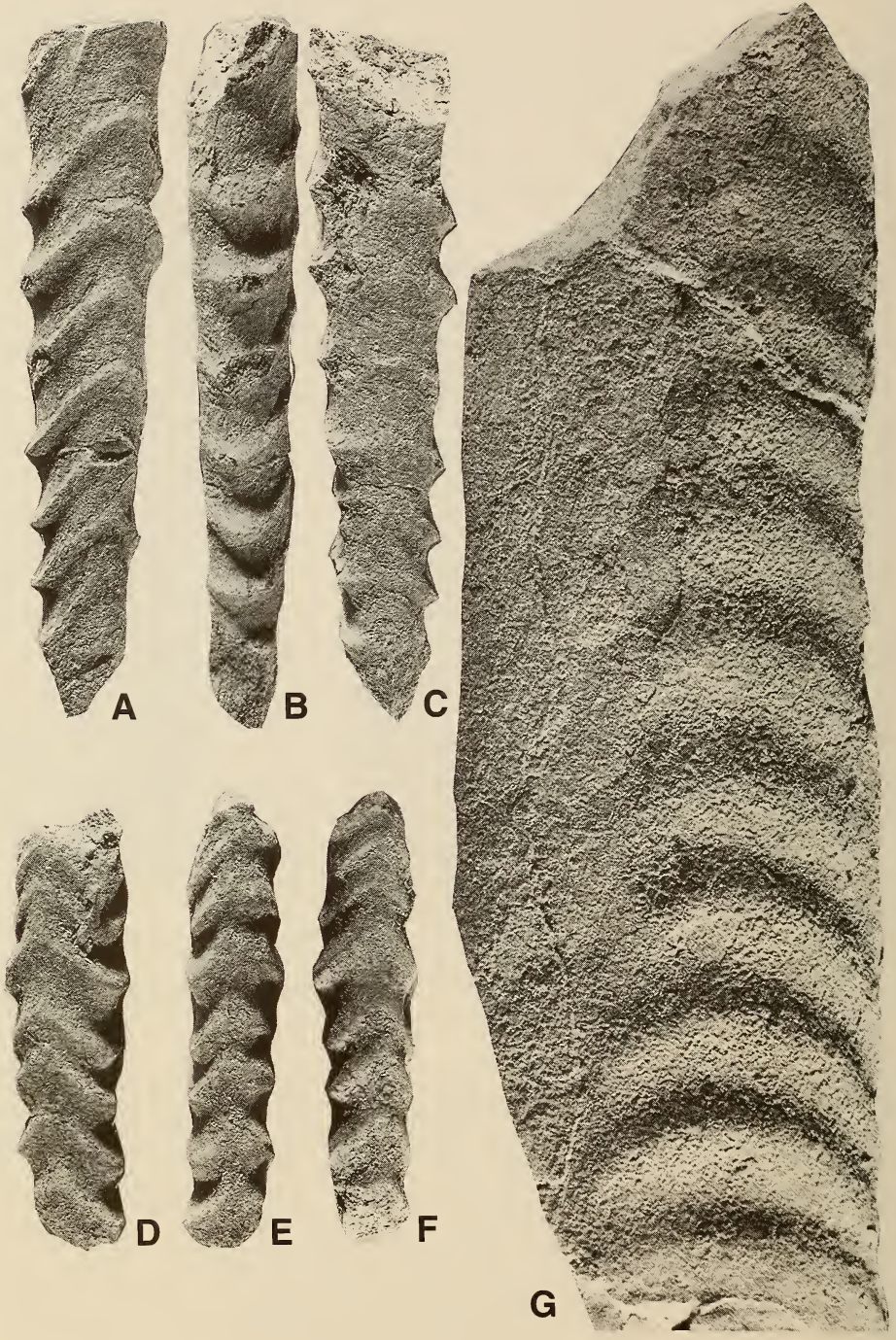
Most of the specimens have a compressed, ovoid whorl section, but we suspect that this is mainly due to secondary deformation. A few specimens, e.g. Figure 5I-J, show a near-circular whorl section.

The most striking feature of this species is the strong lateral, ventral and, in some cases, also dorsal ribbing. These ribs arise near the dorsum, curve back near the upper quarter of the dorsum, and then curve forwards over the ventral part of the flanks. In some specimens, e.g. Figure 4B-D, the ribs are markedly thickened at the point where the curvature of the ribs changes. In most



Fig. 1. *Baculites alavensis* Santamaria Zabala, 1996. EC1-108a from the Upper Campanian of Ecay. $\times 1$.

specimens, the ribs pass over the venter without diminishing in strength and with a sharp apertural curvature. Bifurcating or intercalatory ribs near the venter are extremely rare. Ribbing over the dorsum is generally much weaker than on the flanks or on the venter (e.g. Fig. 2A-C), but in some specimens (e.g. Fig. 2D-F) ribbing on the dorsum is nearly, or as strong as, on the rest of the shell. Rib density is generally two-and-a-half to three ribs per whorl height, but it may be as low as two (Fig. 3G-I). Some of our specimens appear to be completely devoid of ribbing (e.g. Fig. 4A). We suspect that these are merely rare, smooth variants of *B. alavensis* rather than a different species. Part of the aperture is preserved in one specimen (Fig. 3A-C).



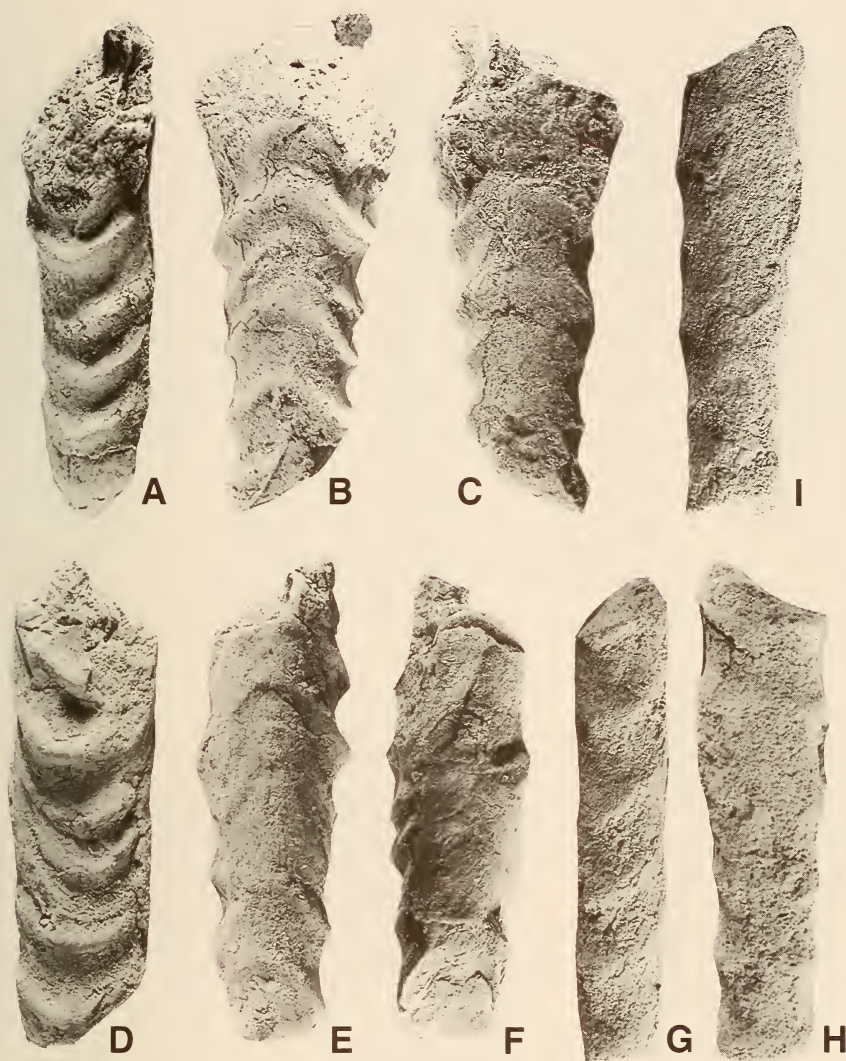


Fig. 3. *Baculites alavensis* Santamaria Zabala, 1996. A-C. EC1-107. D-F. EC1-106/e. G-I. EC1-106/d. All from the Upper Campanian of Ecay. All $\times 1$.

Fig. 2 (see facing page). A-F. *Baculites alavensis* Santamaria Zabala, 1996. A-C. EC1-100+26 m/7. D-F. EC1-100+26 m. Both from the Upper Campanian of Ecay. G. *Baculites leopoliensis* Nowak, 1908 (SAM-PCPol2917) from the Lower Maastrichtian (?Upper Campanian) of Piotrawin, Poland. All $\times 1$.

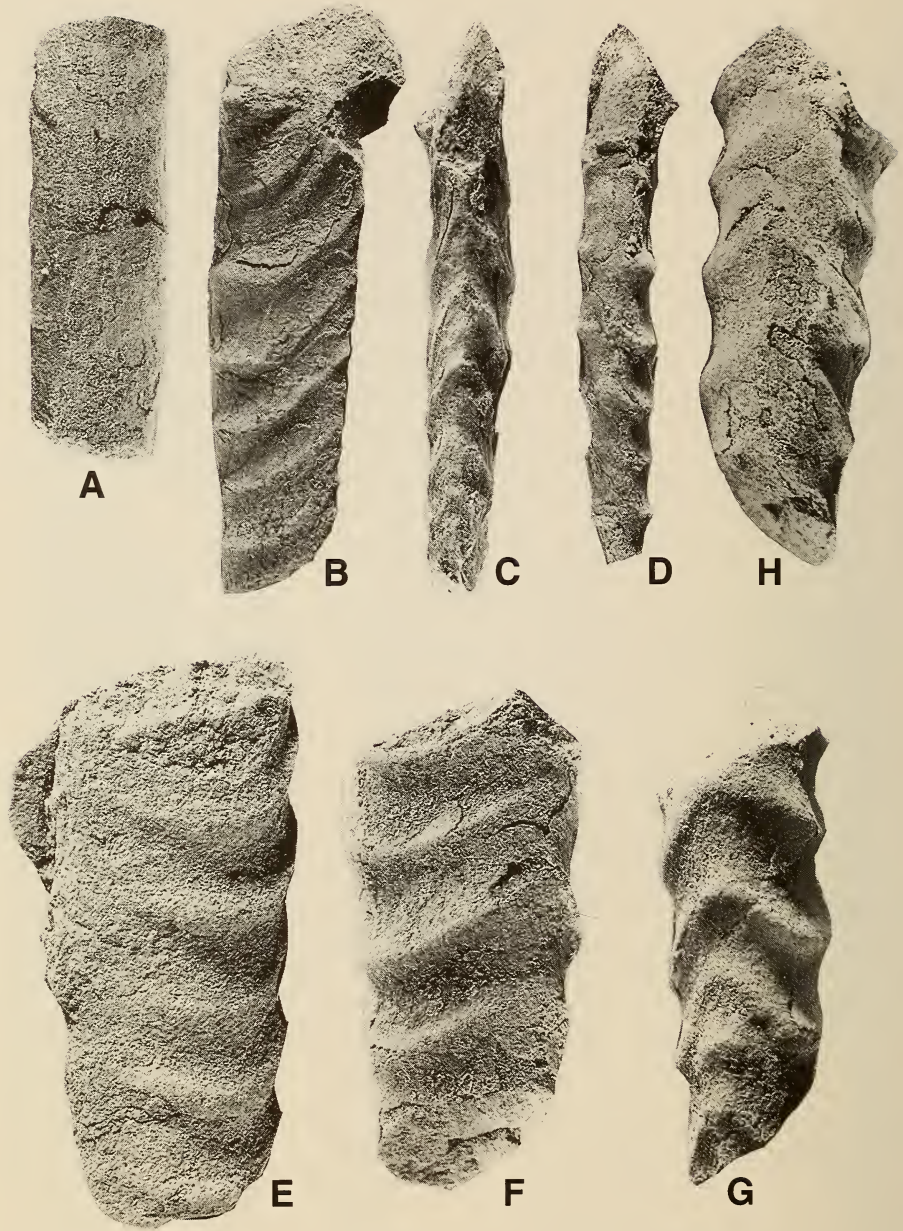


Fig. 4. *Baculites alavensis* Santamaria Zabala, 1996. A. EC1-102/4. B-D. Ec1-106/a. E. Ec1-106/b. F-H. Ec1-106/c. All from the Upper Campanian of Ecay. B, D $\times 1$; A, E-H $\times 2$.

Discussion

The strong lateral and ventral, and in some cases dorsal ribbing, easily distinguishes this species from all other European Campanian baculites.

Our material adds to the range of variation of *B. alavensis* described by Santamaria Zabala (1996: 14, pl. 3 (figs 7–9)). The holotype (pl. 3 (fig. 8)) and one of the paratypes (pl. 3 (fig. 9)) clearly show the strong circumperipheral ribbing as found in some of our specimens.

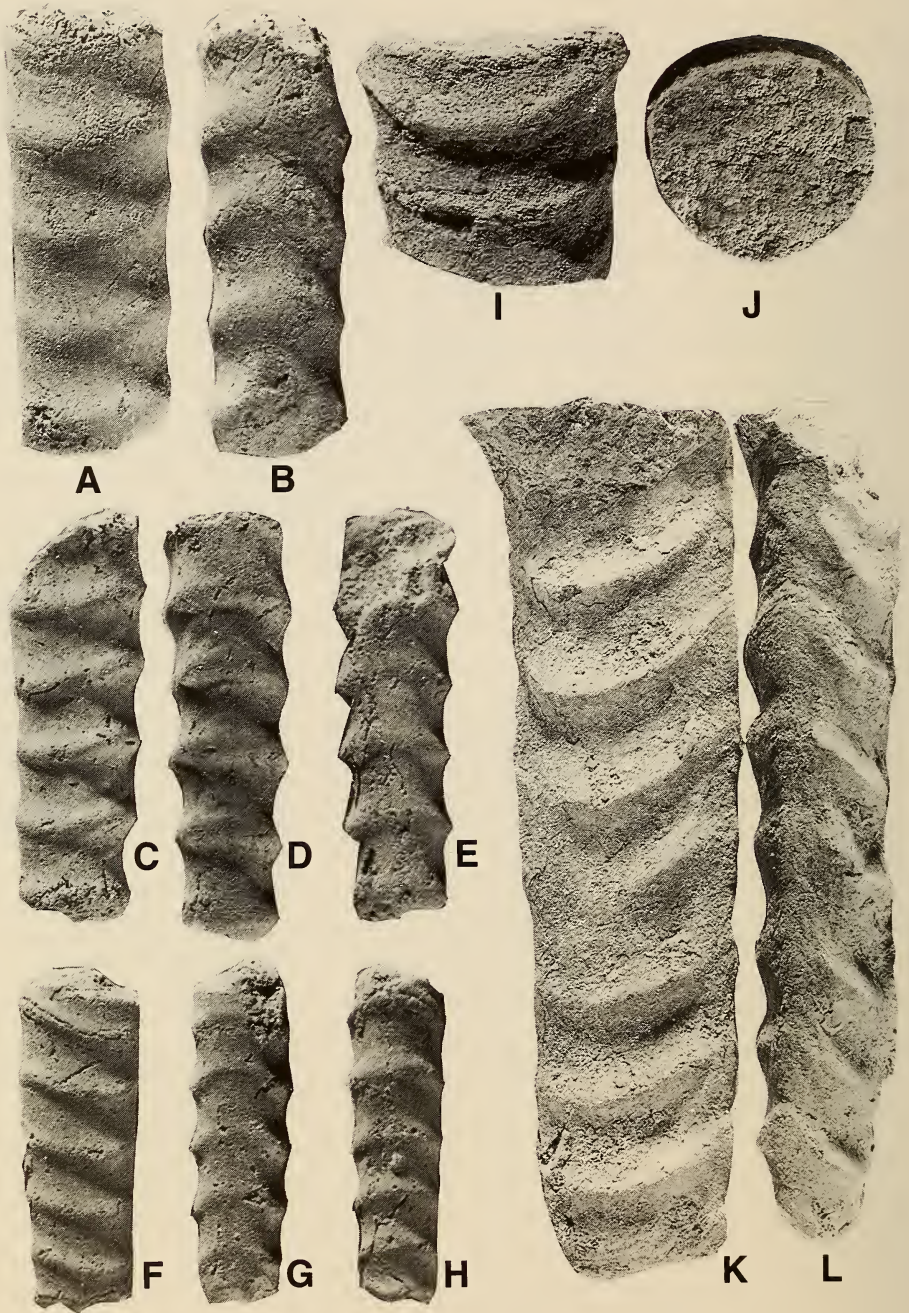
We suspect that the material described as *B. leopoliensis* by Kennedy in Kennedy *et al.* (1986, pl. 2 (figs 1–2, 11–12), pl. 13 (figs 22–24)), does not belong to that species but rather to *B. alavensis*. Ornament in *B. leopoliensis* normally consists of crescentic ribs on the flanks that project over the venter, often with intercalatories. Some specimens, however, lack the lateral ribs and are completely smooth. None of the Polish examples of *B. leopoliensis*, as figured by Nowak (1908, pl. 14 (figs 1–11)) and material in Klinger's (SAM) collection, Figure 2G, however, have as strong ribbing as that of *B. alavensis*; nor have we seen any with strong dorsal ribbing. Even though most of our material and that of Santamaria Zabala is diagenetically deformed, some specimens show a virtually circular whorl section. That of *B. leopoliensis* is distinctly compressed. The age of *B. leopoliensis* is uncertain. Following Nowak (1908), the species was traditionally regarded as being of Maastrichtian age (see e.g. Kennedy 1986a, 1986b). However, according to Hancock & Kennedy (1993: 165), they found *B. leopoliensis* only in the Upper Campanian zone of *Nostoceras (N.) hyatti* in various sections in Poland. Klinger (Machalski 1996), however, found *B. leopoliensis* (Fig. 2G) associated with *Diplomoceras cylindraceum* at Piotrawin in Poland, which suggests that the stratigraphic range of *B. leopoliensis* may extend into the Maastrichtian, or, alternatively, that *D. cylindraceum* may already occur in the Upper Campanian.

The generally stronger ribbing, which in cases may be circumperipheral, and the more inflated whorl section are sufficient to distinguish *B. alavensis* from *B. leopoliensis*.

Baculites alonsoi Santamaria Zabala (1996: 13, pl. 3 (figs 3–6)) is more weakly ornamented than typical *B. alavensis* and ribbing is restricted to the dorsal part of the flanks. Morphologically it is intermediate between *B. leopoliensis* and *B. alavensis*.

The specimen described by Kennedy (1986a: 113, pl. 18 (figs 2–3)) as *Baculites* sp. 5 from the Upper Campanian of Courgeac (Charente) Aquitaine is probably *B. alavensis*. What is of interest, is that Kennedy compared the species to *Baculites columna* Morton (1834: 44, pl. 19 (fig. 8)) (Fig. 5A–H), the type species of the Maastrichtian genus *Trachybaculites* Cobban & Kennedy, 1995. That species, however, typically has straight, circumperipheral ribbing rather than crescentic as in *B. alavensis*. *Trachybaculites* has simplified sutures (see e.g. Cobban & Kennedy 1995, fig. 17.25–17.26). Unfortunately, none of our specimens shows the suture, so it is not possible to determine if *B. alavensis* could possibly be an early Upper Campanian representative of *Trachybaculites*.

Amongst the Indo-Pacific species, only *B. sulcatus* Baily, 1855, and juvenile *B. vanhoepeni* Venzo, 1936, have ornament similar to that of *B. alavensis*. Both species were recently reviewed by Klinger & Kennedy (1997). *Baculites*



vanhoepeni has closely spaced crescentic lateral ribs in the juvenile stage (see Klinger & Kennedy 1997, fig. 79m), but in the adult stage the ornament consists of very characteristic auricular, widely spaced ribs that are confined to the flanks (see e.g. Klinger & Kennedy 1997, fig. 93). Ornament in the Lower Campanian *B. sulcatus* is extremely variable, ranging from nearly smooth to strong, circumperipheral ribs. Some strongly ornamented forms of *B. sulcatus* (Klinger & Kennedy 1997, fig. 64e-g, m-l) are indistinguishable from *B. alavensis*, but in the majority of specimens ornament is more of the *B. capensis*-*B. vanhoepeni* type.

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Fig. 5. A-H. *Trachybaculites columna* (Morton, 1834). A-B. SAM-PCA112918. C-E. SAM-PCA112919. F-H. SAM-PCA112920. All from the Upper Maastrichtian Prairie Bluff Chalk at roadside at railway track, south side of Linden, Marengo County, Alabama. I-L. *Baculites alavensis* Santamaria Zabala, 1996. I-J. Unregistered. K-L. Ec1-107. Both from the Upper Campanian of Ecay.
A-H $\times 2$; J-L $\times 1$.

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